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Checklist for One Health Epidemiological Reporting of Evidence (COHERE)

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ABSTRACT

One Health is defined as the intersection and integration of knowledge regarding humans, animals, and the environment, yet as the One Health scientific literature expands, there is considerable heterogeneity of approach and quality of reporting in One Health studies. In addition, many researchers who publish such studies do not include or integrate data from all three domains of human, animal, and environmental health. This points to a critical need to unify guidelines for One Health studies. This report details the Checklist for One Health Epidemiological Reporting of Evidence (COHERE) to guide the design and publication format of future One Health studies. COHERE was developed by a core writing team and international expert review group that represents multiple disciplines, including human medicine, veterinary medicine, public health, allied professionals, clinical laboratory science, epidemiology, the social sciences, ecohealth and environmental health. The twin aims of the COHERE standards are to 1) improve the quality of reporting of observational or interventional epidemiological studies that collect and integrate data from humans, animals and/or vectors, and their environments; and 2) promote the concept that One Health studies should integrate knowledge from these three domains. The 19 standards in the COHERE checklist address descriptions of human populations, animal populations, environmental assessment, spatial and temporal relationships of data from the three domains, integration of analyses and interpretation, and inclusion of expertise in the research team from disciplines related to human health, animal health, and environmental health.

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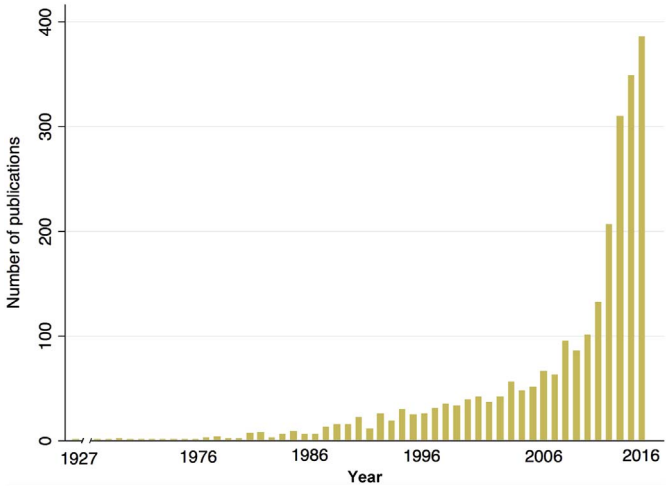

Fig. 1. Number of papers published per year identified with the search terms "One Health" or "One Medicine" in Pubmed (1927–2016).

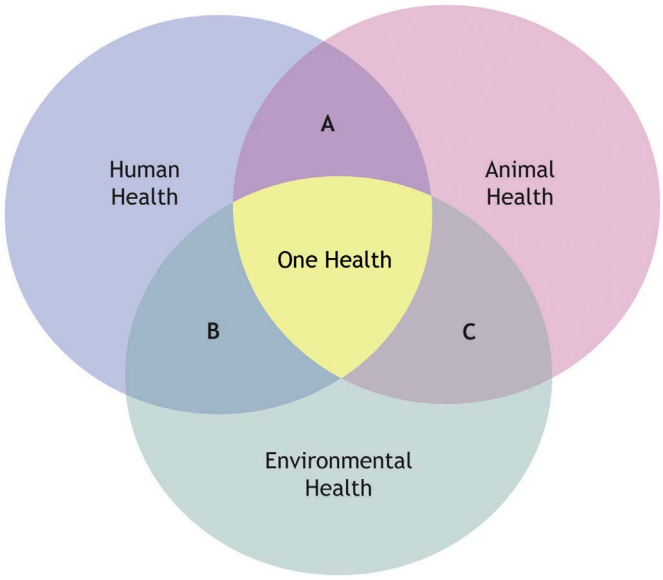

Fig. 2. Venn diagram illustrating the three domains of One Health. (A) Epidemiological studies relating factors between animal and human health; (B) Epidemiological studies relating factors between environmental and human health; (C) Epidemiological studies relating factors between animal and environmental health.

1. Introduction

With the increased recognition that diseases often emerge out of interactions of human, animal, and environmental factors, a new approach to address these issues has arisen, known as One Health. The roots of this paradigm lie in the fertile grounds of comparative pathology, driven by the remarkable efforts, perspectives, and writings of William Osler, Calvin Schwabe, Rudolf Virchow, and many others [1]. This early foundation, focused mainly on the "one medicine" intersection of human and animal health, has grown into an effort that also incorporates preventative medicine and public health approaches, particularly environmental health and ecohealth [2]. In recent years, One Health has been described as "the collaborative effort of multiple disciplines — working locally, nationally, and globally — to attain optimal health for people, animals and our environment" [3]. The One Health approach, therefore, involves combined assessment of health risks across the three domains of humans, animals, and the environment, and it involves design and implementation of intervention and prevention strategies that address all three sectors with a goal to produce integrated knowledge [4].

A One Health approach, by definition, encompasses many fields, and these include, but are not limited to, infectious diseases, chronic diseases, toxicology, ecology, agriculture and sustainability, conservation medicine, economics, anthropology, ethnography, and the social sciences. The approach can inform efforts to develop and implement studies or programs related to human and animal wellness, mental health and wellbeing, and the human-animal bond. However, the fields in question often are segregated by methodology, funding, and publication [5]. Requirements from funding sources and publication silos may contribute to the fracture of One Health studies into multiple, discipline-specific studies and/or publications. At the same time, the term "One Health" has become increasingly common in the biomedical literature (Fig. 1). As the literature expands, authors of this document and contributing experts who have conducted systematic reviews have noted considerable heterogeneity of approach and quality of reporting in One Health studies [4,6,7]. Such lack of consensus on criteria that constitute a well-designed and clearly-presented One Health study jeopardizes the impact of this growing field and limits the ability of the reader to judge the strengths and limitations of this literature.

To build on the foundation of scholarship and provide scope and guidance for future work, we propose the following Checklist for One Health Epidemiological Reporting of Evidence (COHERE) for research publications classified as One Health studies. We intend this work to

Box 1
Glossary of key terms used in the standards and text.

Ecohealth: an integrated systemic approach to health incorporating the sustainability of ecosystem health services and social stability to maintain peaceful coexistence of humans, animals and their environments [27].

Captive exotic animal: An animal of a non-domesticated species that is living under human control.

Domestic animal: Companion and food-producing species that have lived for many generations with humans and whose characteristics and traits are generally considered to be under human control.

Epidemiological studies: Studies that determine the distribution of diseases in populations and the factors that may drive this distribution.

Free-ranging wild animal: An animal of a non-domesticated species that is living largely outside of human control.

Generalizability: applicability of research study findings from a sample population to the larger, target population.

Inter-professional education: training approach that brings together and fosters collaboration among students of various disciplines in order to enhance collaboration and promote acquisition of interdisciplinary knowledge.

Qualitative data: data that are non-numerical.

Quantitative data: numerical data.

Semi-qualitative data: data that have a numerical hierarchy but are presented in terms of categories or scales.

Signalment: An animal's age, sex, species and breed.